

## ABSTRACT

### SCRATCH-RESISTANT OPTICAL MULTI-LAYER SYSTEM APPLIED TO A CRYSTALLINE SUBSTRATE

An optical multi-layer system on a crystalline substrate is described, which is obtainable by a process in which a composition comprising nanoparticles having polymerizable and/or polycondensable organic groups is applied to a crystalline substrate; the groups of the nanoparticles are polymerized and/or polycondensed to form an organically crosslinked layer; one or more further layers are applied in the same way and the resulting layer composite is consolidated thermally in a single stage and the organic constituents present are burnt out; for the last layer applied, optionally, the polymerization and/or polycondensation of the groups of the nanoparticles to form an organically crosslinked layer can be effected directly in the final stage or the nanoscale inorganic solid particles may have no polymerizable and/or polycondensable organic groups.

The optical multi-layer systems produced are suitable as scratch-resistant interference layer systems, such as reflection and antireflection coatings on a crystalline substrate. The system is suitable, for example, for sapphire substrates such as sapphire watchglasses.